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April 2008

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Socio-Economics and the Environment in Discussion
CSIRO Working Paper Series **2008-04**


**April 2008**
ISSN: 1834-5638

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# The Contingent Valuation Method: Retrospect and Prospect

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ABSTRACT

*This paper explores the contingent valuation method for environmental valuation. Issues are raised over the validity of the approach as a method of assessing the underlying preferences of individuals. An alternative interpretation is given to the method as a means of exploring underlying motivation in a rich vein of social psychological research.*

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## INTRODUCTION

The contingent valuation method (CVM) is a controversial approach by which economists have attempted to place a value upon environmental changes. The basic method involves a questionnaire which asks a respondent their willingness to pay (WTP) for an environmental improvement or their willingness to accept (WTA) compensation for a loss or degradation of environmental assets or quality. The resulting stated preference is most commonly used as a mean value of the change and then aggregated across the relevant population and discounted for time. The original justification was the need to include the resulting monetary value as part of a cost-benefit analysis (CBA) to aid project appraisal. The theoretical basis for such an approach relies upon micro-economic welfare theory where individual's maximise their utility subject to an income constraint, or minimise their expenditure subject to a utility constraint (see Hanley and Spash, 1993).

The CVM has proven the most popular of the available methods for monetary valuation of the environment. There are three main reasons. First, the technique has the air of simplicity, and indeed early surveys contained very little beyond a direct question on WTP or WTA and a few socioeconomic details. Second, the range of applications has seemed unlimited because such questions could apparently be asked concerning provision of any environmental "good or service". A related point is that the CVM provided freedom from being restricted by available economic data which had limited all previous approaches to secondary data. Third, the range of "economic values" was expanded to categories previously outside the economists grasp so that the CVM introduced measurement of option, existence and bequest values. These new categories have been termed passive or indirect use values - the term "non-use" is misleading as preference utilitarianism means all economic values

are based upon utility or usefulness to an individual. However, all three supposed advantages have proven controversial. Critiques of the first and third advantages have involved psychological perspectives, including concerns that preferences are labile and constructed with susceptibility to framing effects and variations in context and elicitation procedures rather than stable, complete and transitive (Fischhoff, 1991; Kahneman et al., 1993; Schkade and Payne, 1994).

Vatn (2004) has identified two camps amongst economists concerning environmental valuation. First are those who regard all anomalies as 'measurement bias' to be removed by careful design and data censoring. Second are those who dismiss the whole valuation exercise, and CVM in particular, due to inconsistency with neoclassical theory. This paper explores the development of these positions while focussing upon the specific role psychology has and can play in aiding the debate. In doing so the argument is developed that understanding the motives behind responses to CVM surveys is important for improving choice theory. This is in accord with what Vatn (2004) has termed a third way where neither of the existing alternative camps hold sway.

In the next section a brief review is conducted of how the CVM interacted with psychology while moving from an experimental technique to a high profile internationally recognised method of environmental valuation. This leads to a discussion of the extensive attempts which have been made to address controversy via dictating survey design. The topic of bias is introduced and the specific areas covered include strategic behaviour, hypothetical bias, WTP vs WTA, and information bias. The findings suggest the need for work on individual motivation for survey responses. Ethical beliefs are noted as an often neglected aspect of motivation for CVM responses, but shown to be important factors on the basis of existing empirical

results. The paper closes by drawing some conclusions on future research directions and on the use of the CVM in decision making processes.

## CVM DEVELOPMENT AND THE PSYCHOLOGICAL PERSPECTIVE

CVM developed in the United States especially amongst researchers at the University of Wyoming in the late 1970s and early to mid 1980s eg. Ralph d'Arge, David Brookshire, Bill Schulze, Betsy Hoffman. There was an early interest in behavioural theories associated with this work and explorations of experimental economics using student subjects. Hanemann (1994: 21) has claimed the link with psychology took place at a workshop conducted to review the CVM which was summarised by Cummings, Brookshire and Schulze (1986), hereafter CBS. However, there was already awareness within this North American environmental economics community of a range of psychological ideas, and the CBS volume was merely the first time this became more readily apparent. Indeed, the connection had been made decades earlier by Ciriacy-Wantrup of whom d'Arge had been a student.

As an early advocate of "interrogating" social groups as to their WTP for collective extra-market (i.e. public) goods, Ciriacy-Wantrup argued that:

> "Interrogating and voting can be used for quantitative determination as well as for ranking of values. Considerable progress has been made recently in designing and evaluating group interrogations by questionnaire and interview. Economists, so far, have made little use of this progress in the field of individual and social psychology. Welfare economics could be put on a more realistic foundation if a closer cooperation between economics and certain branches of applied psychology could be established" (Ciriacy-Wantrup, 1947: 1190).

Yet, despite this early signpost, various attempts at establishing more formal links with social psychology and behavioural theories have proven far from easy.

Participants at the CBS workshop who were advocating the use of attitude-behaviour models from social psychology were extremely critical of their reception: "We certainly underestimated the barriers to interdisciplinary communication. Our proposal that economists consider the attitudes-behaviour literature has met with indifference or hostility. CBS are no exception" (Bishop and Heberlein, 1986: 141).

Another attendee at the CBS workshop was the psychologist Daniel Kahnemann whose work has shown many of the flaws in economic models of human behaviour with the risk related research earning him a Nobel Prize in economics. However his CVM research with Jack Knetsch (a pioneer of travel cost and hedonic pricing) provoked strong and defensive reactions, especially the paper on embedding (Kahneman and Knetsch, 1992). Kahneman and Knetsch (1992) describe WTP under the CVM as the purchase of moral satisfaction rather than an exchange value. This has been linked to a contribution model claiming that, while economists interpret WTP as purchasing a public good, respondents are stating charitable contributions reflecting their attitudinal concerns. Kahneman et al. (1993: 314) then argue that, if the only objective of measurement is to rank-order issues, WTP is "not the preferred way of doing so because it is psychometrically inferior to other measures of the same attitude."

Critical work on the CVM funded by Exxon Corporation also employed psychological approaches (Hausman, 1993). Exxon was concerned by the use of the CVM as legal evidence indicating multi-billion dollar environmental damages arising from the Exxon Valdez tanker oil spill in Alaska. In particular psychologists Schkade and Payne (1993; 1994) cited cognitive and decision making theories to establish their case for the use of verbal protocol analysis. They found that CVM responses were consistent with the construction of preferences, and reflected moral satisfaction

and symbolic values. Hanemann blamed the results upon the open-ended format employed and argued for the need to "work on the instrument until you get a tighter response" (see Hausman, 1993: 297-299). Indeed a standard response of CVM experts is to argue for improvement in the techniques employed rather than to question the underlying theory.

Following such reasoning, the National Oceanic and Atmospheric Administration (NOAA) hired a group of experts to produce a report on the CVM which amounted to a list of guidelines. The CBS workshop had produce shorter and more general guidelines. The approach of the NOAA Panel included such extensive recommendations that no survey was ever likely to meet them all and still remain within the bounds of what the general public might be expected to reasonably respond to (a typical CVM interview lasts about 20 minutes). The increased technical complexity, in-house interviews, larger samples required for the recommended dichotomous choice model, along with attempts to achieve the elusive goal of perfect random sampling, all added to expense for CVM surveys. The surveys done for the Exxon Valdez case are cited as costing several million dollars by aiming for random sampling; these might have been conducted at a fraction of the cost by using convenience samples to create behavioural models for prediction of population responses on the basis of average population information (Harrison and Lesley, 1996).

The technique had moved in a decade from an obscure experimental approach to a high profile legally endorsed policy tool. Throughout the 1970s CVM studies had remained US based and largely of academic interest. In the 1980s and 1990s studies took place first in Europe and then less developed economies, and became increasingly connected to government decision processes. This fitted well

with pro market governments in Europe and the USA. In the USA cost-benefit analysis returned to the public policy arena with President Reagan's Executive Order 12291 in 1981, and five years later the CVM was incorporated into regulations for measuring the damages associated with oil spills and hazardous wastes (Department of the Interior, 1986). US Superfund legislation, aimed at hazardous waste site clean-up, then also involved cases where the CVM was employed. In the UK the Government's emphasis on monetary valuation increased and by 1988 the Department of the Environment was sponsoring work by environmental economists and soon recommending the use of CVM for both project and policy appraisal (Department of the Environment, 1991). A further boost to the general ease of applying CVM surveys was given by Mitchell and Carson (1989) who provided a widely used manual for those wishing to avoid various pitfalls. A bibliography in 1994 listed almost one thousand CVM studies and papers world-wide (Carson et al., 1994). The Exxon case which led to the NOAA Panel report merely provided further endorsement for advocates because two Nobel Laureates could now be cited amongst those approving the CVM. Of course the proviso was that the method be conducted in very specific ways in order to address all the problems which had become apparent.

## REFINING SURVEY DESIGN

Many studies under the CVM, and especially earlier studies, were conducted for research purposes using small, non-representative, convenience samples (eg. undergraduate students) and were performed by untrained interviewers (eg. postgraduate economics students) without any quality control. There are key areas where such studies can be shown to be inadequate. Several lessons should now have been learnt.

(i) Survey design should involve easily understood and pre-tested language, taking onboard all feedback from focus groups not just that which is convenient;

(ii) Data collection requires attention to sample size, collection methods, sample representation of the general population, and randomised selection;

(iii) Interpreting the values obtained as market prices requires knowledge of and respect for the restrictions imposed by the theoretical economic model;

(iv) Empirical analysis requires the correct statistical tests;

(v) Reliability and validity tests need to be conducted with the presentation of regression results explaining bids (WTP/WTA) as a function of relevant factors;

(vi) Where this has been done the explanatory power has often proven very low, but this then requires explanation and attention.

This would seem to argue in favour of best practice guidance for economists. However, survey design seems to be more of an art than a science, at least beyond following some basic common sense as to general social science practice. In addition, there seems to be some difficulty in separating out scientific requirements of good practice from politically motivated desires, and this applies to the still dominant set of guidelines i.e. those of the NOAA Panel.

The NOAA Panel was set within a struggle between competing parties, as evidenced by the inclusion of two Nobel Laureates from different camps in the Exxon Valdez legal battle: Kenneth Arrow (Exxon consultant) and Robert Solow (State of Alaska consultant). Their recommendation of “conservative” design to achieve low value estimates appears to be aimed at meeting civil service/political desires and avoiding the embarrassment of excessively large numbers overturning policies or pet projects and annoying lobby groups. This conservative design argument has since been transferred to the UK and most prominently for a CVM survey employed to

support a tax on aggregates extraction (Department of the Environment Transport and the Regions, 1999); in this case numbers were significantly and explicitly reduced by survey design and the use of a 25% discount rate. Conservative design seems theoretically unjustifiable (Knetsch, 1994).

Indeed several NOAA recommendations are questionable. The exclusive use of WTP formats is used to reduce the size of numbers produced and ignores the beliefs held about rights in society as opposed to what is legally defined (Knetsch, 2005). The exclusion of open-ended formats has been used to ignore results showing anomalies, although the alternative close-ended formats (eg. dichotomous choice) have increasingly recognised problems of their own. A decade ago Willis (1995) noted the culturally specific context of the NOAA Panel recommendations and that, for example, voting on hypothecated taxes is totally outside UK experience. Even within the USA Hanemann (1994: 20) has admitted that "…there are few cases where local governments actually set environmental quality." This argues against the approach of a referendum format on taxes as being realistic and familiar to "the public", although this has not prevented Hanemann advocating that approach. Despite, or perhaps because of, the drawbacks, the guidelines have proven popular with practitioners and the search for "a manual" has been emulated elsewhere eg. in the UK by the Department of Environment, Transport and the Regions (Bateman et al., 2002).

The fundamental drive for those economists trying to refine the method in this way has been to find the Holy Grail survey which can access "true values" as expressed by preferences. This encapsulates the concept of an ideal design to replicate a hypothetical market situation including the incentive structures. The aim is to measure individual preferences on the basis that they are pre-formed. The survey

instrument should then be “neutral” and any information provided merely informs those preferences rather than forming them.

CVM economists have developed various concepts of “bias” which are believed to obscure “true values”. The concerns have changed over time, even though older problems remain unresolved. Key issues in the more recent literature have been for avoiding hypothetical bias, information bias, scope/scale insensitivity and the embedding effect, and bid elicitation under dichotomous choice formats. Issue given much less frequent explicit coverage include the role of ethics and attitudes, the formation of preferences within the survey administration process, and the treatment of bid item non-response. In the remainder of this section several key “bias” problems are reviewed, while the next section probes into some of the less commonly addressed issues and links these to theories from social psychology.

*Strategic Bias*

A repeatedly referenced concern of economists is the potential for individuals to mislead others in order to gain some advantage for themselves. This is termed strategic behaviour and free riding. In the neoclassical economic model there are no social rules or norms for behaviour and the only ethical guide is individual preference satisfaction. Sen pointed out the problems with such an approach some time ago (Sen, 1977), i.e. that such a world would soon fall apart due to the selfish interested parties actions, unbounded by the norms of social behaviour and institutions. Still the issue of strategic behaviour is prominent as an explanation for anomalies in data.

In CVM this usually arises where there are “outlier” bids of a very large amount which have a strong influence on the mean. This should only be regarded as a problem when the bid is unlikely to occur because the individual lacks the income to

pay or would actually accept a much lower amount as compensation. However, the justification of strategic bias is used to implement a simple censoring (eg. 5% trimming) without much attention to the actual intention of respondents making these bids. The NOAA Panel "conservative" design recommendation is further used to support this blanket trimming approach. Free riding is usually described as under bidding on the basis that the public good will be provided in any case, and this has then been linked to hypothetical bias (i.e. over bidding in WTP surveys and then reducing the bid when actual payment is requested). The solution offered is to choose "incentive compatible" designs to make individuals avoid such behaviour, although there is also recognition that all designs have their problems and can merely result in different strategies of under or over bidding (Carson, Flores and Meade, 2001).

The preoccupation of economists with strategic behaviour seems to lack a good empirical basis in CVM results. For example, an extensive review of CVM studies in the health care literature found no instances of strategic bias (Klose, 1999). Indeed reviews of CVM often make reference to strategic behaviour without citing any empirical case studies and merely take its existence as given; instead, they concentrate on the implications and alternative "incentive compatible" bid designs (eg., Carson, Flores and Meade, 2001; Hanley and Shogren, 2005). The evidence which is sometimes offered concerns the divergence between hypothetical requests and actual requests which would appear to be an issue with other potential dimensions.

*Hypothetical Bias*

Economists typically use secondary data in their work, which makes the CVM an unusual foray into the world of direct contact with people. One aspect of early and

persistent criticism has then been that the survey is hypothetical rather than an actual market and therefore cannot be trusted to produce realistic results. Hypothetical bias is where individuals fail to answer as if they were in an actual market trade-off situation so that when they are asked for an actual payment, or given compensation, they reject this or their answers diverge significantly in amount.

Typically, WTP is cited as being over estimated by CVM surveys. However, the evidence appears somewhat mixed with most work being experimental and the relationship of this to environmental scenarios in CVM surveys then being unclear. There have been reviews addressing the issue. For example, Carson et al. (1996) compared 83 studies involving stated versus revealed preferences and found slight underestimation in the CVM results compared to actual payments. Such meta studies imply no generalised rule can be applied for “calibration”. At the level of an aggregated bid from a given study there may be no difference between a modern CVM survey and actual payments with real goods, but at the individual bid level there can be considerable variation (see study by Bhatia and Fox-Rushby, 2003). Recent experimental results corroborate this finding, and add that for individuals giving low bids they may underestimate their WTP while those giving high bids overestimate (Camacho-Cuena et al., 2004). However, the results would seem to depend upon the type of “commodity” under consideration and the specific context being put forward. Variations in design and circumstance make generalised results difficult to discern. For example there are major differences between asking populations at risk from malaria their WTP for a mosquito net (eg., Bhatia and Fox-Rushby, 2003), which has known benefits, and asking those in urban areas their WTP for saving an endangered species of, say, elephant (eg., Bandara and Tisdell, 2004).

As mentioned above, hypothetical bias has been linked to strategic behaviour, but without adequately testing why people respond the way they do. When interviewed after a CVM survey, there is good evidence for respondents having a very different understanding of what they are doing than that attributed to them by economists (Burgess, Clark and Harrison, 1998). Participants challenge claims that the CVM is a democratic process for ensuring that public values are incorporated in policy decisions, and argue for a decision-making institution where local people can contribute to environmental policy decisions through dialogue with scientists and policy-makers (Clark, Burgess and Harrison, 2000). Such evidence suggests, the CVM process can be viewed as a technique of 'dialogue-at-a-distance' between researchers and respondents which involves encoding and decoding of the 'good'. Incomplete specification of the environmental change, which would seem normal, means respondents are able to bring their own readings to their interpretation of the scenario so that researchers cannot know precisely what 'good' respondents were attempting to 'value' (Burgess, Clark and Harrison, 2000). Respondents may also show: difficulties in contextualising a scenario and how much it might be worth in both monetary and non-monetary terms; an inability to work out a value for one scheme in isolation from others; and feelings that values are incommensurable, i.e., money vs. Nature (Clark, Burgess and Harrison, 2000).

In order to know why people give the answer they do some probing of motivations would seem necessary, rather than just drawing inferences. The divergence between stated and revealed preferences might then be paralleled to the Fishbein-Ajzen (1975) attitude behaviour model and the difference between stated and actual behaviour. In this case motivations might be based upon attitudes and social norms. Extending the economic research in this direction might then enable

better understanding of the reasons for the stated WTP prior to researching the link of stated to revealed WTP (Spash, 1998; 2006).

One application in this direction does exist on the subject of hypothetical bias. Picking-up on the idea of Cummings and Taylor (1999), that entreaties to avoid regarding the CVM survey as hypothetical can remove that bias, Ajzen et al. (2004) have tested for motivations using the Theory of Planned Behaviour (Ajzen, 1991). The predictive power of the model is improved by the entreaties. They argue that norms are activated by the entreaties and that these are already operative in an actual payment scenario. The scenario of WTP towards a college fund amongst 169 students is far removed from environmental applications of the CVM, and the authors qualify their results against generalisation to other contexts and populations. The use of entreaties in the above studies was conducted on a single bid referendum while when a payment range is used only those at the high end are affected (Brown, Ajzen and Hrubes, 2003; Murphy, Stevens and Weatherhead, 2005). In contrast Aadland and Caplan (2003) find a short entreaty exacerbates the bias. Overall the role of these entreaties and whether they are a form of persuasion to get conformity to the economists' prior expectation remains rather unclear. However, this move seems to reinforce the need for motivational research and collaboration with social psychologists and others.

*WTP Versus WTA*

A persistent difference has been found between WTP and WTA with the latter typically four to five times greater than the former. This was noted early on in the development of the technique and was a major concern (Knetsch and Sinden, 1984; Thayer, 1981). Empirical studies since then, including those involving actual goods in experimental situations, have found people systematically value losses, measured

by WTA, two to four times more than otherwise commensurate gains, measured by WTP (Knetsch, 2005: 96). Attempts at explaining the difference within a neoclassical economic framework have included income effects, strategic behaviour and goods having imperfect substitutes (Hanemann, 1991; Shogren et al., 1994). However, these fail to account for the large and consistent variations in CVM surveys, and generally cannot explain divergence where the conditions required by standard theoretical explanations are violated (Knetsch, 2005).

An alternative explanation is the psychological impact of “ownership” of a good actually changing the demand function and indeed causing it to become kinked. This has been termed by economists an “endowment effect” (Knetsch and Sinden, 1984; Thaler, 1980), with the associated psychological explanation being loss aversion (Kahneman, Knetsch and Thaler, 1991) termed “prospect theory” (Kahneman and Tversky, 1979). Experimental results show the large differences between people's valuations of gains and losses, and are inconsistent with the axioms of completeness, transitivity, and dominance. That is, economic analyses and predictions of consumer behaviour are largely based on theories inconsistent with actual choices (Knetsch, 1995). The repeatedly found differences in the valuation placed on goods and money, depending on whether entitlements are being acquired or given up, provide direct evidence of preference assumption violations.

In this light the NOAA Panel recommendation of only using WTP formats takes on a different form. In effect a troublesome aspect of behavioural findings has been largely excluded by the CVM community from further consideration. Indeed the argument has been put forward that WTP is less problematic, preferred by business, causes less protesting and, therefore, can be substituted for WTA (Hanley and

Shogren, 2005). Recent US EPA (2000) guidelines perpetuate this substitution mistake (see critical review by Knetsch, 2005).

As Knetsch has noted the choice of welfare measure depends upon the reference state which people associate with a given environmental change (Knetsch, 1994), and their feeling of psychological ownership rather than legal entitlements (Knetsch, 2005). Property rights may be contested so that the general public, as in the case of environmental damages, must assert their position, but in CVM these decisions are made behind closed doors. Hanley and Shogren (2005: 16-17) seem to regard a UK policy case where WTA was thrown out for WTP as a success, although the process they describe involved a complaint by the industrial polluter against the WTA study, the Government commissioning a new study, and the newly commissioned experts adopting WTP and producing far smaller damage estimates. Some might question the credibility of such a process let alone its standing as scientific analysis.

In the expert discussions of design for the same study, Hanemann argued that people are unfamiliar with the WTA format. This idea is strange in light of the fact that every payment by a purchasing agent is matched by an acceptance of monetary compensation on the part of the selling agent. So every market transaction involves a WTA and a WTP simultaneously. Some studies have even explored this (Amigues et al., 2002; MacMillan, Duff and Elston, 2001), with one scenario showing WTA to achieve environmental change can be more familiar to a given group (eg. farmers) than WTP is for another (eg. the public) (Bateman et al., 1996).

The importance of context within which exchange occurs should then be noted. For example, there is no reason to expect WTP to diverge from WTA under the loss aversion theory if there is no aversion to loss eg. when the person accepting payment

is in the business of selling and that is indeed their goal. This unfortunately leads some to the tortuous tautological argument that if only people were educated in the ways of the market and given the right incentives (carrots and sticks) then they would conform and produce the required results consistent with market theory (List, 2003); after all "…evidence exists suggesting that people can learn to act rationally" (Hanley and Shogren, 2005: 29). The language used in these justifications also has unfortunate connotations with the problem apparently being that behaviour goes "unpunished by market discipline" (Shogren and Hayes, 1997: 243). The theory requires people to behave in a certain way and they can be made to do so; this ability to reify economic theory is then meant to be comforting.

Before leaving the topic I will note two other related issues. First, Knetsch (2005) notes that behavioural findings show people value future losses more than future gains which implies different discount rates. Others have found negative discount rates for gains (see Lowenstein, 1987; Lowenstein and Prelec, 1991), and other behaviour inconsistent with economists' claims (Lowenstein and Prelec, 1992). Second, economists ignore the moral considerations which people take into account when considering environmental damages. This is important for understanding intergenerational issues (Spash, 2002b), and has also been related to the WTP-WTA divergence under environmental scenarios with motivations including feelings of responsibility for harm, dissociation of entities or changes from the market place and trade-offs, and the activation of social norms (see the review by Brown and Gregory, 1999).

*Information Bias*

In environmental valuation, information has largely been discussed in terms of whether providing more information on an issue is likely to increase WTP. The assumption is that objective information relevant to the valuation of an entity can be provided by the interviewer in different quantities. Due to the sensitivity of responses to the information supplied the pre-testing of the survey, and more recently focus groups, have become of increasing importance. The NOAA Panel recommended CVM aim for a level of information provision "…at least as high as that which the average voter brings to a real referendum on the provision of a specific public good,…", and make use of 'follow-up questions' on understanding (Arrow et al., 1993: 4607). Their guidelines recommend that: "Adequate information must be provided to respondents about the environmental program that is offered. It must be defined in a way that is relevant to damage assessment" (Arrow et al., 1993). However, the meaning of being 'adequately' informed with 'relevant' information is vague and the methods by which individuals assimilate and process information unexplained. Those economists trying to understand human valuation of environmental entities need to know how individuals form their preferences, the key factors which change preferences and their stability.

Acceptance that any presentation of information must be moulded and environmental issues explained within a given frame means the information issue is often conceptualised in terms of a 'framing' problem (eg. Boyle, 1989). A separation is then attempted between the substance of information (objective data) and the way in which information is supplied or questions asked (framing). Changes in the former are expected to impact perceptions and valuations while if the latter do so this is

regarded as a bias. Objective data is meant to describe the 'commodity' to be valued while the framing is merely the method of obtaining a WTP or WTA measure.

Only if an actual environmental change can be defined 'objectively' can the aim of bringing all individuals to a common understanding of that change have a certain logic. This may be questionable even for a common market commodity (eg. a house). Certainly a set of physical attributes might be defined. Yet, there are often disagreements between different individuals over the condition of the commodity (eg. the property with "much potential") and definition of attributes (eg. is a small room a single bedroom or a store room?). A divergence between actual and perceived conditions then becomes harder to define and reliance falls upon subjective perception. The problem is compounded for complex environmental issues. The situation is one where "…the CVM practitioner has no practical anchor for accuracy" and "…must then rely upon individual perceptions of environmental change-related effects…", which means "…variations across individuals of CVM values *may* reflect differences in perceptions of the hypothesized commodity" (Cummings, Brookshire and Schulze, 1986: 57-58).

In addition, disagreement has existed over what exactly constitutes a framing problem as opposed to defining attributes of the 'commodity'. In particular, unresolved issues surround whether the payment mechanism (eg. income tax, trust fund) or institutional arrangements (government, charity) are to be included as framing issues. The difference in treatment means such factors are either a cause of bias to be avoided or individuals should be regarded as valuing 'different' commodities constituted of various attributes which are then widely defined. The bias position implies qualification of the results as an under or over estimate of some 'true' value, while the commodity change position limits any generalisation of values

outside the specific context described making every CVM result specific to a unique "commodity" (Spash, 2002a).

One thing seems clear, the role of the analyst or survey design team remains central to bounding the information set. Which issues need to be presented, in what format and detail are matters where differences of opinion will result and the outcome can be expected to influence people's perception of the valuation question. However, the analyst may conceive of information and its interpretation by respondents in one way, while respondents interpret that same information in unexpected ways as far as the analyst is concerned, i.e. what Burgess, Clark and Harrison (2000) term encoding and decoding. One aspect of this divergence in understanding arises because environmental issues concern value conflicts. These may, for example, relate to fundamental disagreements over the role of markets and how environmental issues should be addressed. Environmentalists might then be expected to see concerns of justice and rights as central aspects while economists always look for the implicit trade-off. The former may reject the very commensurability which the latter take as given and design into their surveys.

The information presented about an environmental good or service has been connected to the motive to process information (Ajzen, Brown and Rosenthal, 1996). This motive is determined by an individual's ability to understand the issue and their perception of the personal relevance of the issue to them. If their motivation is high then they enter central processing mode and scrutinise and evaluate information with regard to the substance of the argument. This allows WTP to be increased by favourable reporting of the benefits. Alternatively, a low motivation means peripheral processing mode is entered and moods and subtle cues become determining factors in responses. This leads to the argument that the WTP for a public good is affected

more by stimulating a moral perspective when individuals are in peripheral processing mode (Ajzen, Brown and Rosenthal, 1996).

Spash (2002a) offers a different model for the role of ethical beliefs. In an environmental CVM survey any concerns which an individual holds as ethical beliefs, such as utilitarianism or rights, might come into play directly. That is, rather than being 'peripheral' to the description of environmental changes these are likely to be key issues. Along with environmental attitudes and social norms, such ethical beliefs would feed into the reasoning over whether to make a monetary trade-off. The empirical results presented by Spash (2002a) show that the same information influences individuals differently so that some individuals find they are being informed while others feel their preferences are being formed, during an identical CVM exercise. This impact on the formation of preferences during a CVM survey influences the bid. Thus the idea of a neutral or objective set of data on an environmental change is challenged and the meaning of information bias brought into question. In addition, rather than finding fundamental ethical beliefs to be peripheral matters which can be cued to distort valuation processes, such beliefs are found to be key determinants of the values expressed. While ethical beliefs are strongly related to the way in which information is processed the evidence counters the proposal of Ajzen et al. (1996), and instead supports a model where those in central processing mode call upon ethical positions to value environmental changes.

## CONCLUSIONS

The CVM has proven a controversial technique of environmental valuation, but rather than dismiss the extensive primary data collected this paper suggests economists learn from the empirical evidence. Attempts to remove all "anomalies" via survey design have proven flawed. Certainly some aspects of early work were poor in terms

of social science research approaches and there is still room for improvement, but many results cannot be explained away on that account and many have been corroborated via experimental evidence. Design of a perfect single survey to reveal true preferences is a misguided ideal. Worse is the attempt to force behavioural conformity to the expectations of the economic analyst to achieve “market discipline”. Indeed anomalies show the richness and variety of human motivation and behaviour and as a result the need for learning across disciplines.

One problem with the approach of searching for the perfect survey instrument and set of guidelines is how this then restricts future research. CVM surveys are conducted for different reasons with different requirements. These are mainly as follows:

(i) as research exercises, including work by students to get degree qualifications;

(ii) as theoretical and experimental research tools by academics;

(iii) as aids to project appraisal;

(iv) evidence in litigation for damages, apparently solely in the USA

(v) as part of public policy debates, including advocacy by vested interest groups and government agencies.

The failure of the CVM community is to recognise these different roles and their different requirements and institutional contexts. This is particularly important in light of a decade of dominant reference to the NOAA Panel guidelines as the ultimate authority on how to conduct a valid CVM survey.

Turning to motivation means paying attention to the work done in social psychology. Studies have started being conducted using measures of pro-social choice and other theories. These indicate the importance of attitudes in understanding WTP. However, they also show attitudes and stated WTP are far from

identical. Indeed social norms and perceived behavioural control both appear relevant, although results for environmental change are mixed across the few existing studies. Ethical positions are also found to be consistently important.

The evidence supporting the role of ethical positions in explaining WTP is growing in the area of environmental valuation. Such a relationship may not generalise outside environmental behaviours. However, in this context, the divergence between beliefs in rights and consequentialism appears fundamental to understanding stated bids under the CVM.

Overall the CVM can be seen as a means of expanding the economists' conception of human psychology and behaviour. Philosophical concepts such as incommensurability and rights, of which economists tend to be either ignorant or scornful, cannot be dismissed. The empirical evidence is showing the importance of understanding the motives for human behaviour and the existence of plural values in society.

REFERENCES

Aadland, D. and Caplan, A.J. (2003) Cheap talk reconsidered: New evidence from CVM. *Department of Economics*. Utah State University**:** 24pp.

Ajzen, I. (1991) The theory of planned behaviour. *Organisational Behaviour and Human Decision Processes* 50: 179-211.

Ajzen, I., Brown, T.C. and Carvajal, F. (2004) Explaining the discrepancy between intentions and actions: The case of hypothetical bias in contingent valuation. *Personality and Social Psychology Bulletin* 30(9): 1108-1121.

Ajzen, I., Brown, T.C. and Rosenthal, L.H. (1996) Information bias in contingent valuation: Effects of personal relevance, quality of information and motivational orientation. *Journal of Environmental Economics and Management* 30(1): 43-57.

Amigues, J.P., Boulatoff, C., Desaigues, B., Gauthier, C. and Keith, J.E. (2002) The benefits and costs of riparian analysis habitat preservation: A willingness to accept/willingness to pay contingent valuation approach. *Ecological Economics* 43(1): 17-31.

Arrow, K., Solow, R., Portney, P.R., Leamer, E., Radner, R. and Schuman, H (1993) Natural Resource Damage Assessment Under the Oil Pollution Act of 1990. *Federal Register* 58(10): 4601-4614.

Bandara, R. and Tisdell, C. (2004) The net benefit of saving the Asian elephant: A policy and contingent valuation study. *Ecological Economics* 48(1): 93-107.

Bateman, I.J., Carson, R.T., Day, B. Hanemann, M. Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Ozdemioglu, E., Pearce, D.W., Sugden, R. and Swanson, J. (eds.). (2002) *Economic Valuation with Stated Preference Techniques: A Manual*. Cheltenham: Edward Elgar.

Bateman, I.J., Diamand, E., Langford, I.H. and Jones, A. (1996) Household willingness to pay and farmers' willingness to accept compensation for establishing a recreational woodland. *Journal of Environmental Planning and Management* 39(1): 21-44.

Bhatia, M.R. and Fox-Rushby, J.A. (2003) Validity of willingness to pay: hypothetical versus actual payment. *Applied Economics Letters* 10(12): 737-740.

Bishop, R.C. and Heberlein, T.A. (1986) Does contingent valuation work? In *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method*. R.G. Cummings, D.S. Brookshire and W.D. Schulze (eds.). Totowa, New Jersey: Rowman and Allanheld: 123-147.

Boyle, K. (1989) Commodity specification and the framing of contingent valuation questions. *Land Economics* 65: 57-63.

Brown, T.C., Ajzen, I. and Hrubes, D. (2003) Further tests of entreaties to avoid hypothetical bias in referendum contingent valuation. *Journal of Environmental Economics and Management* 46(2): 353-361.

Brown, T.C. and Gregory, R. (1999) Why the WTA-WTP disparity matters. *Ecological Economics* 28(3): 323-335.

Burgess, J., Clark, J. and Harrison, C.M. (1998) Respondents' evaluations of a CV survey: A case study based on an economic valuation of the wildlife enhancement scheme, Pevensey levels in East Sussex. *Area 30*(1): 19-27.

Burgess, J., Clark, J. and Harrison, C.M. (2000) Culture, communication, and the information problem in contingent valuation surveys: A case study of a Wildlife Enhancement Scheme. *Environment and Planning C: Government and Policy* 18(5): 505-524.

Camacho-Cuena, E., Garcia-Gallego, A., Georgantzis, N. and Sabater-Grande, G. (2004) An experimental validation of hypothetical WTP for a recyclable product. *Environmental and Resource Economics* 27(3): 313-335.

Carson, R.T., Flores, N.E., Martin, K.M. and Wright, J.L. (1996) Contingent valuation and revealed preference methodologies: Comparing the estimates for quasi-public goods. *Land Economics* 72(1): 80-99.

Carson, R.T., Flores, N.E. and Meade, N.F. (2001) Contingent valuation: Controversies and evidence. *Environmental and Resource Economics* 19(2): 173-210.

Carson, R.T., Wright, J., Alberini, A., Carson, N. and Flores, N. (1994) A Bibliography of Contingent Valuation Studies and Papers. La Jolla, California, Natural Resource Damage Assessment, Inc.

Ciriacy-Wantrup, S. (1947) Capital returns from soil conservation practices. *Journal of Farm Economics* 29: 1188-1190.

Clark, J., Burgess, J. and Harrison, C.M. (2000) "I struggled with this money business": Respondents' perspectives on contingent valuation. *Ecological Economics* 33(1): 45-62.

Cummings, R.G., Brookshire, D.S. and Schulze, W.D. (eds.). (1986) *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method*. Totowa, New Jersey: Rowman and Allanheld.

Cummings, R.G. and. Taylor, L.O. (1999) Unbiased value estimates for environmental goods: A cheap talk design for the contingent valuation method. *American Economic Review* 89(3): 649-665.

Department of the Environment Transport and the Regions (1999) The Environmental Costs and Benefits of the Supply of Aggregates: Phase 2. London, Department of the Environment Transport and the Regions. 208.

Department of the Environment, UK. (1991) *Policy Appraisal and the Environment: A Guide for Government Departments*. London: Her Majesty's Stationary Office.

Department of the Interior (1986) Final rule for natural resource damage assessments under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). *Federal Register* 51(148): 27674-27753.

Fischhoff, B. (1991) Value elicitation: Is there anything in there? *American Psychologist* 46: 835-847.

Fishbein, M. and Ajzen, I. (1975) *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, Massachusetts: Addison-Wesley.

Hanemann, W.M. (1991) Willingness to pay and willingness to accept: How much can they differ? *American Economic Review* 81(3): 635-647.

Hanemann, W.M. (1994) Valuing the environment through contingent valuation. *Journal of Economic Perspectives* 8(4): 19-43.

Hanley, N. and Shogren, J.F. (2005) Is cost-benefit analysis anomaly-proof? *Environmental and Resource Economics* 32(1): 13-34.

Hanley, N. and Spash, C.L. (1993) *Cost-Benefit Analysis and the Environment*. Aldershot, England: Edward Elgar.

Harrison, G.W. and Lesley, J.C. (1996) Must contingent valuation surveys cost so much? *Journal of Environmental Economics and Management* 31(1): 79-95.

Hausman, J.A., (ed.). (1993) *Contingent Valuation: A Critical Assessment*. Amsterdam: North-Holland.

Kahneman, D. and Knetsch, J.L. (1992) Valuing public goods: The purchase of moral satisfaction. *Journal of Environmental Economics and Management* 22(1): 57-70.

Kahneman, D., Knetsch, J.L. and Thaler, R.H. (1991) Anomalies: The endowment effect, loss aversion, and status-quo bias. *Journal of Economic Perspectives* 5(1): 193-206.

Kahneman, D., Ritov, I., Jacowitz, K.E. and Grant, P. (1993) Stated willingness to pay for public goods: A psychological perspective. *Psychological Science* 4(5): 310-315.

Kahneman, D. and Tversky, A. (1979) Prospect theory: An analysis of decision under risk. *Econometrica* **47**(2): 263-291.

Klose, T. (1999) The contingent valuation method in health care. *Health Policy* 47(2): 97-123.

Knetsch, J.L. (1994) Environmental valuation: Some problems of wrong questions and misleading answers. *Environmental Values* 3(4): 351-368.

Knetsch, J.L. (1995) Asymmetric valuation of gains and losses and preference order assumptions. *Economic Inquiry* 33(1): 134-141.

Knetsch, J.L. (2005) Gains, losses, and the US EPA economic analyses guidelines: A hazardous product? *Environmental and Resource Economics* 32(1): 91-112.

Knetsch, J.L. and Sinden, J.A. (1984) Willingness to pay and compensation demanded: Experimental evidence of an unexpected disparity in measures of value. *Quarterly Journal of Economics* 99(3): 507-521.

List, J.A. (2003) Does market experience eliminate market anomalies? *Quarterly Journal of Economics* 118(1): 41-71.

Lowenstein, G. (1987) Anticipation and the valuation of delayed consumption. *Economic Journal* 97: 666-684.

Lowenstein, G. and Prelec, D. (1991) Negative time preference. *American Economic Review* 81: 347-352.

Lowenstein, G. and Prelec, D. (1992) Anomalies in intertemporal choice: Evidence and an interpretation. *Quarterly Journal of Economics* 107: 573-597.

MacMillan, D.C., Duff, E.I. and Elston, D.A. (2001) Modelling the non-market environmental costs and benefits of biodiversity projects using contingent valuation data. *Environmental and Resource Economics* 18(4): 391-410.

Mitchell, R.C. and R.T. Carson (1989) *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington DC: Resources for the Future.

Murphy, J.J., Stevens, T.H. and Weatherhead, D. (2005) Is cheap talk effective at eliminating hypothetical bias in a provision point mechanism? *Environmental and Resource Economics* 30(3): 327-343.

Schkade, D.A. and Payne, J.W. (1993) Where do the numbers come from?: How people respond to contingent valuation questions. In *Contingent Valuation: A Critical Assessment*. J. A. Hausman (ed.). Amsterdam: Elsevier Science Publisher: 271-293.

Schkade, D.A. and Payne, J.W. (1994) How people respond to contingent valuation questions: A verbal protocol analysis of willingness to pay for an environmental regulation. *Journal of Environmental Economics and Management* 26(1): 88-109.

Sen, A. (1977) Rational fools: A critique of the behavioral foundations of economic theory. *Philosophy and Public Affairs* **6:** 317-344.

Shogren, J.F. and Hayes, D.J. (1997) Resolving differences in willingness to pay and willingness to accept: Reply. *American Economic Review* 87(1): 241-244.

Shogren, J.F., Shin, S.Y., Hayes, D.J. and Kliebenstein, J.B. (1994) Resolving differences in willingness to pay and willingness to accept. *American Economic Review* 84(1): 255-270.

Spash, C.L. (1998) Environmental Values and Wetland Ecosystems: CVM, Ethics and Attitudes. Cambridge, Cambridge Research for the Environment, Department of Land Economy, University of Cambridge.

Spash, C.L. (2002a) Informing and forming preferences in environmental valuation: Coral reef biodiversity. *Journal of Economic Psychology* 23(5): 665-687.

Spash, C.L. (2002b) Dividing time and discounting the future. In *Greenhouse Economics: Value and Ethics*. C.L. Spash (ed.). London: Routledge: 201-220.

Spash, C.L. (2006) Non-economic motivation for contingent values: Rights and attitudinal beliefs in the willingness to pay for environmental improvements. *Land Economics* 82(4): 602-622.

Thaler, R. (1980) Toward a positive theory of consumer choice. *Journal of Economic Behavior and Organization* 1(1): 39-60.

Thayer, M.A. (1981) Contingent valuation techniques for assessing environmental impacts: Further evidence. *Journal of Environmental Economics and Management* 8: 27-44.

US Environmental Protection Agency (2000) Guidelines for Preparing Economic Analyses. Washington DC, United States Environmental Protection Agency.

Vatn, A. (2004) Environmental valuation and rationality. *Land Economics* ***80***(1): 1-18.

Willis, K. (1995) Contingent valuation in a policy context: The National Oceanic and Atmospheric Administration Report and its implications for the use of contingent valuation methods in policy analysis in Britain. In *Environmental Valuation: New Perspectives*. K. G. Willis and J. T. Corkindale (eds.). Wallingford: CAB International: 118-143.